

**ANNUAL ADMINISTRATIVE REPORT - FY2002
AND
ANNUAL WORK PLAN – FY 2003**

**SAN FRANCISCO AREA NETWORK
INVENTORY AND MONITORING PROGRAM**

The San Francisco Area Network includes Eugene O'Neill National Historic Site, Fort Point National Historic Site, Golden Gate National Recreation Area, John Muir National Historic Site, Muir Woods National Historic Site, Pinnacles National Monument, Point Reyes National Seashore, and the Presidio of San Francisco.

San Francisco Area Network Approval Signatures:

_____ Don Neubacher, Superintendent, Point Reyes National Seashore	_____ Date
_____ Mai-Liis Bartling, Acting Superintendent, Golden Gate National Recreation Area	_____ Date
_____ Cicely Muldoon, Superintendent, Pinnacles National Monument	_____ Date
_____ Glenn Fuller, Superintendent, Eugene O'Neill and John Muir National Historic Sites	_____ Date
_____ Jennifer Bjork, Network I&M Coordinator San Francisco Bay Area Network	_____ Date
_____ Penny Latham, Regional I&M Coordinator Pacific West Region	_____ Date

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FY02 ANNUAL ACCOMPLISHMENTS/ FY03 WORK PLAN

SFAN Inventory and Monitoring Program

I. Overview and Objectives

The San Francisco Area Network (SFAN) includes eight parks with significant natural resources in the central California region. These parks include Eugene O'Neill National Historic Site (EUON), Fort Point National Historic Site (FOPO), Golden Gate NRA (GOGA), John Muir NHS (JOMU), Muir Woods National Monument (MUWO), Pinnacles National Monument (PINN), the Presidio of San Francisco and Point Reyes National Seashore (PORE). The Presidio of San Francisco, FOPO and MUWO are within the boundaries of GOGA and are included as part of GOGA for the purposes of this annual report. A few areas of the Presidio have significant natural resources and are embedded within GOGA, such as Crissy Field, and therefore, were also included in the SFAN. The SFAN also decided to include EUON in the inventory and monitoring program because the Las Trampas Regional Wilderness Park surrounds it on three sides, and therefore, significant natural resources might occur there.

Inventory of species and developing a long-term monitoring program are highly important for the SFAN because the parks fall within one of the 6 most significant areas in the nation for biodiversity (Nature Conservancy 2000). Internationally, the SFAN falls within the 8th most significant "hot spot" in the world for biodiversity and at great risk due to rapid human population growth (Cincotta and Engelman, 2000).

The purpose of this document is to report on FY 2002 accomplishments and on the proposed workplan for FY2003 for the SFAN Inventory and Monitoring (I&M) Program. The service-wide I&M program provided funding to the SFAN for conducting inventories (\$131,870) and for monitoring water quality (\$70,000). In addition, the Network received second year funding for vital signs monitoring (\$592,800), which represents a one-year deferral of \$150,000, which was redirected as start-up monitoring funds for another network. The total amount of funds allocated to the SFAN for FY02 was \$794,670.

In FY2002, some monitoring funds were used to develop a vegetation map for PINN and to conduct inventories identified in the Inventory Plan. Also, a few existing projects were supported with monitoring funds with the purpose of reviewing and developing specific monitoring protocols, or of augmenting well-established regional monitoring programs. All existing monitoring activities that are partially or fully funded through the service-wide I&M program are included in this report.

In FY03, the SFAN will receive the fourth year of funding for inventories (\$147,839) as identified in the Inventory Plan, for the water quality program (\$70,000), and the full complement of monitoring funds allocated to the network (\$742,800), for a total of \$960,639.

A. Biological Inventories

In FY2002, inventories were continued or initiated based on the priorities established in the *Study Plan to Inventory Biotic Resources of the San Francisco Bay Area National Parks* (2000). Since 2000, a total of 18xx inventory projects identified in the Inventory and Monitoring Plan were initiated with either Inventory funds (13 projects) or with Monitoring funds (5 projects). In FY2002, the SFAN conducted inventories for 14xx projects funded by the Inventory account and 4xx funded by the Monitoring account. Inventories included vascular plants, multi-species terrestrial vertebrates (including mammals, amphibians, and reptiles), bats, landbirds, rare plants, coastal biological resources, and riparian fauna. The network collected a substantial amount of existing inventory information in 2000; however, the Steering Committee realized that there remained a significant amount of backlog in documentation that is required to populate the NPSpecies database, and so data mining was continued in FY2002 and will continue through FY2004.

As authorized under the initial guidance provided by WASO, some monitoring funds were used to complete inventories identified in the Inventory Plan, but for which there were no designated Inventory funds. Examples include wetland mapping at GOGA and PORE, vegetation mapping on new lands at PINN, and inventory of sensitive species, the California freshwater shrimp (*Syncaris pacifica*), and the Ashy Storm-petrel (*Oceanodroma homochroa*).

In FY03, the SFAN will complete several multi-year inventories including vascular plants at PINN, bats at all parks, and California freshwater shrimp. The Network will continue data mining and inventories of rare plants, coastal biological resources, which will include an inventory of nearshore fishes, and wetlands. There are also planned three new inventories, including multi-species vertebrate inventory at PINN, a survey of sub-tidal and deepwater habitat of GOGA and PORE.

Objectives for Biological Inventories:

1. Compile and evaluate existing documents, data sets and spatial information for each park into standard NPS databases, and ensure such information is accurate and readily available.
2. Continue conducting inventories targeted at taxonomic groups that are below the service-wide goal of 90% verification, and ensure that the species are accurately documented and vouchered.
3. Inventory taxa or habitat of special interest and develop spatial distribution maps and estimates of abundance or condition.
4. Complete baseline vegetation mapping for the network.

B. Vital Signs Monitoring

Since FY2001, the SFAN has taken several actions towards development of the SFAN Monitoring Plan, including hiring key personnel and conducting “vital signs” workshops. In FY2001, the network hired an I&M network coordinator and in FY2002 hired a network data manager and network biological technician. The data manager and the

biological technician are critical in compiling existing information relevant to development of the monitoring plan and in making the information accessible.

In FY2002, individual parks, or groups of parks, completed scoping workshops, designed initial conceptual models, and identified potential park “vital signs” indicators. PINN conducted a workshop in September 2001, JOMU/EUON conducted a joint workshop in the spring of 2002, and GOGA/PORE conducted a joint workshop in July of 2002. Initially, GOGA/PORE had intended on making use of an existing draft monitoring plan developed in 1997, but decided that a revision of that document was appropriate given the length of time that elapsed since the last workshop. The SFAN workshop, which will bring together outside specialists to review the network conceptual model and the proposed indicators, was scheduled for November 2002; however, because the conceptual model for the network was incomplete, the Steering Committee decided to delay the workshop until February 2003.

In FY2003, teams of seasonal biological technicians will enter data, conduct QA/QC and mine data. The Steering Committee and Network staff will continue summarizing data and planning for the network “vital signs” scoping workshop to be held in February, 2003. By the end of 2003, a draft Phase I&II report of the VSM Plan will be ready for review. The SFAN also will augment and/or evaluate some existing long-term monitoring programs and protocols of species that are likely to be selected as indicators in preparation for vital signs monitoring.

Objectives for monitoring:

5. Develop the organizational structure for and administer the “vital signs” monitoring (VSM) program in an efficient and effective manner.
6. Develop and advance the SFAN VSM program in accordance with currently approved scientific methods including identification of monitoring questions, priorities, ecological indicators, measurable objectives, a sampling framework for integrated monitoring and peer review.
7. Evaluate existing monitoring activities and protocols for inclusion in the VSM program.
8. Implement network VSM after protocols have been peer-reviewed and approved. Apply monitoring data to adaptively guide park management of species and ecosystems.

C. Water Resources Monitoring

In FY2001, the SFAN received funding from the Water Resources Division (WRD) to initiate monitoring of water resources but did not hire a network water quality specialist to coordinate these efforts until late in FY02.

In FY03-04, the Water Quality Specialist will develop a Water Quality Monitoring Plan which will be a component of the SFAN VSM Plan. The plan will include network and park-specific objectives, monitoring protocols, a QA/QC plan, implementation plan, data management, and budget. The Water Quality Specialist will coordinate plan development with the Network aquatic professionals focus group (including a hydrologist, geologist,

and aquatic ecologist) and other Network staff. The Water Quality Specialist will work with the Network coordinator to incorporate the Water Quality Monitoring Plan into the overall VSM Plan.

Objectives for water quality monitoring:

9. Coordinate development and approval of a long-term water quality monitoring program for the SFAN.
10. Install and maintain full weather stations, water level monitors, and sediment monitoring stations.
11. Support existing park water quality monitoring programs and integrate with the long-term monitoring plan.

C. Other Natural Resource Inventories

Parks individually and collectively in the SFAN have pursued inventories independently of the I&M program for varied purposes that were funded from other sources. These studies expand upon and reinforce the objectives of the I&M service-wide program. The following is are examples:

Objective 12: Conduct an All Taxa Biodiversity Inventory (ATBI) of Tomales Bay.

Objective 13: Conduct inventories of terrestrial invertebrates

II. Accomplishments for FY 02 and Scheduled Activities for FY03

A. Inventories

Objective 1 – Compile and evaluate existing documents, data sets and spatial information for each park into standard NPS databases, and ensure such information is accurate and readily available.

Several tasks were identified to verify current data, to complete baseline databases by filling in data gaps, and to develop specific database structures so that new inventory data are easily integrated with standard service-wide databases.

Task 1.1 – Verify existing data and search for new information (data mining)

Parks involved: All

In order to standardize verification of current data and new entries with service-wide databases, the SFAN used seasonal biological technicians, trained and led by a Network employee. Centralization was intended to make searches more efficient and avoiding repetition by individual parks.

FY02 Accomplishments:

- A seasonal biotech searched several sources at California Academy of Sciences, the Museum of Vertebrate Zoology at Berkeley and online. The biotech uncovered, for example, a report with information on water temperatures and salinities in San Francisco Bay Area for the early 20th century that is already an important baseline.

- The network data manager updated the NPSpecies database and identifying gaps.
- The PORE data manager searched databases at NOAA and NMFS and attended meetings on collaborating with sharing information with these agencies.

Scheduled FY03 Activities and Products:

- Three to four seasonal biological technicians will fill gaps in knowledge by mining for data at local universities, museum collections and other agencies to document historic species presence and geophysical resource condition using museum specimens, scientific reports, thesis, and other documents.
- The biotechs will verify existing data in NPSpecies and NPBib.
- The SFAN will coordinate data mining efforts with WASO and Klamath Network to eliminate redundant activities.
- The Water Quality Monitoring program will assist seek data on weather by funding 4 pay periods of a GS-6 biotechnician.

Task 1.2 – Enter data into standard NPS databases (NPSpecies, NPBib, Storet) and conduct a review and certification process to ensure that the data are reliable.

Parks involved: All

The ultimate goal of the Network is to have inventories and data mining products properly entered into standard NPS databases so that they are accessible and usable.

FY02 Accomplishments:

- 25 people within the Network took Metadata training.
- 115 aquatic citations were entered into NPBib.
- Very few entries were made into NPSpecies because most inventories are multi-year and are still underway.
- The Network formed a data management focus group to maximize efficiency, identify tasks and delegate responsibility.
- The museum curators at PORE and GOGA met once to jointly resolve specimen storage options, database linkages between ANSI and NPSpecies, and other issues.
- Park and network data managers worked with park staff using the Natural Resource Database Template to develop a database for park based monitoring.

Scheduled FY03 Activities:

- Metadata will be completed for all existing databases at all parks.
- Continue data entry into NPSpecies and other NPS databases for all ongoing and completed inventory projects.
- GOGA data will be differentiated between FOPO, MUWO, and GOGA for all databases.
- The Network data manager will ensure that digital data meets FGDC metadata standards for contracts, cooperative agreements and in-house projects.
- New project databases will be designed based on the Natural Resource Database Template.

- With a critical mass of data managers to be hired in FY03, the data management focus group will review and coordinate data management issues for all parks in the Network.
- The network data manager will take the lead in reviewing and certifying the existing species data in the NPSpecies database to ensure that the data are reliable.

Task 1.3 – Develop data structures for legacy databases.

Parks involved: All

Historic park databases need to be entered into standard NPS data structures to make the information available to resource managers.

FY02 Accomplishments:

- The Network Data Manager, working with park data managers, reviewed historic databases, including 25+ years of harbor seal and elephant seal data and several years of rare plant inventories, for conformity with NPS standards, archiving, ease of use and compatibility with other databases.

Scheduled FY03 Activities:

- The Network Data Manager will develop an Access database template for several new databases in order to create uniform data entry that will roll up into standard NPS databases.
- The Network Data Manager will train and assist park data managers with development of uniform data structures for weather, pinnipeds and one other legacy database and devise strategies for data entry.

Task 1.4 – Create and standardize GIS spatial coverages

Parks involved: All

Park managers use map products from GIS spatial coverages for analysis and evaluations. The resulting graphs, tables and maps can explain resource condition and trends. The SFAN is developing a Network GIS Plan and several network-wide GIS coverages.

FY02 Accomplishments:

- Rare plant inventories at GOGA and PORE were converted into a GIS database.
- Wetlands field surveys at GOGA and PORE were converted into GIS databases.
- Landbird point counts at PINN, GOGA, PORE, JOMU and EUON surveyed by the Point Reyes Bird Observatory were converted to GIS coverages.
- Multi-species vertebrate surveys at GOGA, PORE, JOMU and EUON were converted to GIS databases by USGS-BRD but still need to be converted to NPS standards.
- Implemented the GIS Theme Manager in order to organize spatial information for JOMU.

Scheduled FY03 Activities:

- Convert PINN aquatic resources inventories conducted in FY01 and FY02 into a GIS database.

- Convert the USGS-BRD multi-species vertebrate inventory data for GOGA, PORE, JOMU, EUON to GIS coverages.
- Revise pinniped habitat GIS database.
- Convert survey of Ashy Storm-petrels conducted in FY02 into a GIS database.
- Complete list of gaps in spatial coverages.
- Gather information for a Network GIS Plan as a component of the Data Management plan to be completed in FY04.

Objective 2 – Continue conducting inventories targeted at taxonomic groups that are below the service-wide goal of 90% verification, and ensure that the species are accurately documented and vouchered.

This is a service-wide inventory goal. Several projects are undertaken each year following the SFAN Inventory Study Plan to complete this inventory objective.

Task 2.1 – Inventory vascular plants.

Parks involved: EUON, JOMU, PINN

Inventories of vascular plants will be completed in EUON, JOMU and PINN by the end of 2003. The only remaining task for vascular plant inventories in the Network is the new land acquired by GOGA. The GOGA new lands were not covered in the Inventory Study Plan since they had not yet been acquired. The Network will consider funding a vascular plant inventory on those lands in the future.

FY02 Accomplishments:

- A cooperative agreement with Point Reyes Bird Observatory to inventory vascular plants for EUON and JOMU was initiated in FY01. Fieldwork was completed in FY02 and a final report was submitted.
- Inventory of 8,000 acres of new lands in PINN was initiated by NPS personnel and is 40% complete. Twenty-four new plant species were documented for PINN, including one new species to science, a new species of mustard. Voucher specimens were collected for documentation.

Scheduled FY03 Activities:

- Add specimens to the JOMU herbarium to complete documentation.
- Complete fieldwork for the inventory of vascular plants on PINN new lands.
- Add specimens to the PINN herbarium to complete documentation.

Task 2.2 – Herbarium assessment

Parks involved: GOGA, PORE, PINN

FY02 Accomplishments:

- The original contractor that was to complete the assessment of the herbariums at PORE, GOGA and PINN defaulted on their contract and the SFAN had to select another contractor to complete the work. This work is now on track and the assessment has been completed.

Scheduled FY03 Activities:

- The herbarium assessment is completed and a final report is due in FY03.

Task 2.3 – Multi-species vertebrate inventory.

Parks involved: All

This was one of the first inventories funded by the Network since it was one of the major information gaps in all parks. At the end of 2002, PINN was the only park still needing this inventory and it will be initiated in FY03. The inventory method utilized by all parks was developed by Dr. Robert Fisher of USGS-BRD and modified by Dr. Gary Fellers of USGS-BRD for application at all parks. The method is a multi-species trap array including coverboards, pitfall traps, Sherman traps, snake traps, and remote cameras.

FY02 Accomplishments:

- The interagency agreement with Dr. Gary Fellers of USGS-BRD to inventory multi-species of vertebrates at EUON and JOMU was initiated in FY01 and is 85% complete. The park has received a preliminary report.
- Dr. Gary Fellers of USGS-BRD inventoried PORE and the northern lands of GOGA in FY2000-2002 and the inventory is complete. Arrays were stratified by 8 habitat types. Over 7,485 identifiable photographs of wildlife were collected. Over 24,072 checks of Sherman traps yielded 3,920 captures and 28,952 checks of pitfall traps yielded 4,597 captures. Thirty-one species of mammal, nine of reptile and seven of amphibian were identified for a total of 47 species of terrestrial vertebrates. One new species, the western skink was added to the park species list for PORE. The final report was completed and is being reviewed.

Scheduled FY03 Activities:

- Conduct winter surveys of vertebrates at JOMU, evaluate the data, and complete the final report.
- Initiate small mammal surveys in PINN with NPS staff.
- Contract surveys of herpetofauna in PINN.
- Update species lists and collect voucher specimens when appropriate.
- Review and approve the USGS-BRD final report for PORE.

Task 2.4 – Survey riparian fauna.

Parks involved: PINN

The riparian corridor is the most diverse and important habitat in PINN, but knowledge about riparian fauna is sparse.

FY02 Accomplishments:

- Using NPS personnel, the park continued to inventory aquatic species in the riparian areas for herpetofauna, invertebrates and fish. The survey was initiated in FY01 and is 50% complete. FY02 was a dry year so sampling could not occur park-wide, but only in the few areas containing water. Over 700 aquatic invertebrates and 180 dragonflies and damselflies were collected and vouchered. PINN added 22 species to those recorded in San Benito County. An NPS website was developed about the dragonflies and damselflies. The streams and reservoir remain free of exotic fish.

Scheduled FY03 Activities:

- Complete surveys if there are sufficient rain and stream flows.
- Update species lists and collect voucher specimens when appropriate.

Task 2.5 – Survey bats.

Parks involved: All.

Sampling for bats involves very different methods from other mammal species, including a “bat detector” that records the sonogram produced by bats. Researchers can then identify what species are present based on the sonar signature. Two outside researchers, USGS-BRD and a contractor are doing the surveys.

FY02 Accomplishments:

- Bat surveys in PORE, JOMU and EUON are 80% complete. Surveys were conducted through an interagency agreement with Dr. Gary Fellers of USGS-BRD.
- Implementation of bat surveys at PINN in FY02 was delayed due to personal reasons of the contractor.

Scheduled FY03 Activities:

- Complete surveys in PORE, JOMU and EUON, analyze data and write reports.
- Initiate bat surveys in GOGA.
- Initiate field surveys for bats in PINN. The survey is anticipated to take 2 years.

Task 2.6 – Complete bird inventories.

Parks involved: JOMU, EUON, PINN

The small parks (EUON, JOMU) have very little information about birds. PINN has a bird checklist but lacks information for the newly acquired lands. Since the Point Reyes Bird Observatory (PRBO) has studied landbirds at PORE and GOGA for many years, these parks have excellent knowledge about landbirds, shorebirds and waterbirds (White 1999). Surveys for all parks will be completed in FY03.

FY02 Accomplishments:

- A cooperative agreement was set up with PRBO in late FY01. PRBO surveyed, verified and updated the landbird species lists for PINN, EUON and JOMU. Field surveys were continued through FY02 and included winter surveys at PINN.

Scheduled FY03 Activity:

- Finish field surveys and verification of the species lists for EUON, JOMU and PINN.
- Update species lists and collect voucher specimens, when appropriate.

Task 2.7 – Coastal biological resources inventory.

Parks involved: GOGA and PORE

Glacier Bay National Park and Preserve (GLBA) developed a field protocol and database for a coastal inventory. SFAN inventory will be modeled after this method and these

tools will be adapted to fit the biological resources and needs of resource managers at PORE and GOGA. Part of the adaptation will include a separate nearshore fish survey. The survey includes identifying the dominant intertidal and supra-tidal species along the coastal zone in different substrate.

FY02 Accomplishments:

- A cooperative agreement was initiated late in FY01 with Dr. Debbie Elliott-Fiske of the University of California, Davis, and in FY02 the park representatives met with UC representatives on several occasions to establish an implementation plan and to review methods. A doctoral graduate student is taking the lead on implementing the program and has visited the parks on a couple occasions to test protocols.
- A cooperative agreement was initiated late in FY02 with Dr. Mike McGowan of San Francisco State University to survey nearshore fishes. The park and SFSU biologists met twice to draft an implementation plan and to discuss protocols.

Scheduled FY03 Activities:

- UC Davis will implement the coastal resources inventory protocol in predetermined and prioritized areas, which were identified in 2002.
- SFSU will implement the survey of nearshore fishes based on predetermined and prioritized areas, which will be identified in early 2003.

Task 2.8 – Sub-tidal and deepwater inventory.

Parks involved: GOGA and PORE

The boundaries of PORE and GOGA extend ¼ mile offshore but the parks lack scientific information. Benthic and subtidal habitat mapping in the nearshore waters is the most effective step that the parks can take to identify species assemblages using side scan sonar and then sampling at sites stratified by substrate. There are timely opportunities to conduct these habitat surveys working with the Gulf of the Farallones National Marine Sanctuary (GFNMS), the California Department of Fish and Game (CDFG) and Moss Landing Marine Laboratory (MLML) since these agencies are currently developing and testing the methods in the region now, as described by Yoklavich et al. (1997). USGS is also conducting LIDAR surveys of the shoreline at GOGA and PORE in 2003, producing high-resolution shoreline delineation using radar.

FY02 Accomplishments:

- The SFAN met twice with GFNMS and MLML to develop a strategy for acquiring existing information, entering the information into a GIS database and identifying areas to survey within the parks.

Scheduled FY03 Activities:

- The SFAN will initiate a cooperative agreement with MLML and develop an implementation plan.
- MLML working with GFNMS, CDFG and NPS will then collect existing sub-tidal habitat data from various sources to assemble in a GIS database. Dr. Gary Greene of MLML will then conduct side scan sonar surveys of the park and

- adjacent waters to identify substrate type. He will then model the distribution of marine benthic species in the subtidal zone based on substrate and other variables.
- The three agencies will then develop a sampling strategy to ground truth the model prediction.
- USGS is conducting LIDAR surveys of the shoreline of GOGA and PORE in the winter of 2003.

Objective 3 – Inventory taxa of special interest, developing spatial distribution maps and estimates of abundance or condition.

The Network decided that several groups of taxa required more intensive inventories including distribution maps and estimates of relative abundance. These groups include threatened, endangered and rare species that may require particular protective strategies, non-native species that may require control actions, and lichens that may become an indicator of air quality at PINN.

Task 3.1 – Inventory and map rare plant populations.

Parks involved: FOPO, GOGA, PORE.

Parks need to know the locations and relative abundances of rare plants since many occur close to urban interfaces and trails or steep slopes that may erode or be disturbed by park activities.

FY02 Accomplishments:

- The inventory of rare plants for PORE, GOGA and FOPO was initiated in FY01 and is 80% complete for PORE and the northern lands of GOGA. An annual report was completed.
- “Rare-Plant-A-Thons” were conducted over two separate weekends at PORE and demonstrated that volunteers can help with inventories. Twenty-three unrecorded rare plant populations were located. Two of these were new additions to PORE. In addition to I&M funding, financial support was obtained from the National Fish and Wildlife Foundation.

Scheduled FY03 Activities:

- The rare plant inventory will be in the third of four years. Surveys of areas south of the Golden Gate Bridge have just begun. In FY04, a portion of the inventory for GOGA’s newly acquired southern lands will be considered for survey, which were not included in the Inventory Study Plan.

Task 3.2 – Inventory and map non-native plant distributions as part of the vascular plant inventory.

Parks involved: All

This inventory is a subset of the vascular plant inventory. An inventory that includes distribution and abundance of non-native species will guide parks in control efforts and in identifying impacts to native communities. Non-native species were identified in the Inventory Plan as an unfunded priority. Monitoring funds were used to conduct the inventory.

FY02 Accomplishments:

- The Network Biotech mapped the distribution of 14 non-native plant species on Mt. Wanda in JOMU. The NPS California Exotic Plant Management Team used the maps for control actions.

Scheduled FY03 Activities:

- The Network Biotech will continue mapping additional non-native populations at JOMU and assist other parks, where appropriate.

Task 3.3 - Survey California freshwater shrimp.

Parks involved: GOGA, PORE

This species federal endangered species was identified in the Inventory Plan as an unfunded priority. Biologists have determined that the presence of California freshwater shrimp is a good indicator of stream condition. Monitoring funds were used to complete the inventory.

FY02 Accomplishments:

- Initiated an inventory of California freshwater shrimp (25% complete) using NPS personnel. Shrimp were located in lower Olema Creek. This is the first record of this species in this creek and expands the number of watersheds containing this endangered species.

Scheduled FY03 Activities:

- Complete shrimp inventory.
- Map distribution and abundance.

Task 3.4 - Survey Salt Marsh Harvest Mouse and Point Reyes Jumping Mouse.

Parks involved: GOGA, PORE

The salt marsh harvest mouse is a federally listed endangered species and the Point Reyes jumping mouse is a federal species of concern. Both are known to occur in the parks but the distribution is not known.

FY02 Accomplishments:

- The SFAN completed an interagency agreement with John Takekawa of USGS-BRD to conduct the first phase of surveys for the salt marsh harvest mouse at GOGA.

Scheduled FY03 Activities:

- USGS-BRD is scheduled to conduct surveys in the winter of 2003 at Rodeo Lagoon and other marshes in GOGA lands.
- A separate interagency agreement task with USGS-BRD will be established to conduct surveys at PORE for these species in 2004.

Task 3.5 - Survey Ashy Storm-petrels.

Parks involved: GOGA, PORE

This species was identified in the Inventory Plan as an unfunded priority. Monitoring funds were used to complete this inventory. Ashy Storm-petrels are a federal species of special concern that occur in only a few places in the world. 10% of the world population is estimated to occur at PORE.

FY02 Accomplishments:

- In FY01, an interagency agreement with Harry Carter at USGS-BRD was made to inventory Ashy Storm-petrels at GOGA and PORE and surveys were conducted in FY02 and FY03. The inventory was completed in FY02. Two new colonies and associated population estimates were discovered at PORE with over 100 birds, which doubled the population estimate for the park. No nesting sites were located at GOGA. A final report was submitted, reviewed and accepted in FY02.

Task 3.6 –Inventory lichens.

Parks involved: PINN

This plant group was identified in the Inventory Plan as an unfunded priority for PINN. Several studies have indicated that the absence of select species of lichen may indicate the presence of particular toxins in the air. Conducting the baseline inventory of lichens in FY03 is timely because toxin analysis is being conducted from some lichen taxa collected at PORE. The Network is poised to conduct this inventory now, so has identified it as a high priority need if funding is available.

FY02 Accomplishments:

- Techniques for sampling and specimen storage were tested based on contacts with lichenologists at Smithsonian and the University of Washington with park-base funds and donations at PORE.
- Information on some rare species of lichen at PINN was collected.

Scheduled FY03 Activities:

- Hire a lichenologist to survey lichens in PINN if funding is available.

Objective 4 - Complete baseline vegetation mapping for the network.

Plant communities are a fundamental component of the biological community; therefore, the Network chose to accelerate vegetation mapping for all parks. Accuracy assessment of the vegetation map for FOPO, MUWO, PORE and GOGA was augmented with I&M funds in FY00. The other parks of the SFAN now need a vegetation map.

Task 4.1 – Complete vegetation mapping.

Parks involved: PINN, PORE, GOGA

FY02 Accomplishments:

- The GIS group at PORE finished the accuracy assessment of the vegetation map for PORE, GOGA, MUWO and ESRI turned in a draft final map. The vegetation classification from ESRI was incomplete and the parks are negotiating with ESRI to get a final product.

- The SFAN initiated a cooperative agreement with the University of Montana to develop a vegetation map for PINN. The addition of new lands from the BLM expanded the size of the park by approximately 50%.
- A soils map is one of the 12 basic I&M inventories and is closely associated with the development of a vegetation map. NRCS is likely to initiate mapping of the soils for PINN within the next couple of years. In preparation for this project, a soils inventory scoping meeting was held at PINN that included personnel from the NPS Geological Resources Division, the Natural Resource Conservation Service, universities and the park. The group identified needs, developed some new inventory parameters and accelerated the scheduling for the NRCS conducted soil inventories for PINN and Contra Costa County.

Scheduled FY03 Activity:

- ESRI will provide a final product to the SFAN for mapping of GOGA, MUWO, FOPO and PORE.
- PINN park staff will characterize vegetation units for a vegetation map classification that the University of Montana will use in defining vegetation communities and making the PINN vegetation map.

Task 4.2 – Assist mapping wetlands.

Parks involved: GOGA, PORE, PINN

Wetlands mapping was identified in the Inventory Plan as an unfunded priority. Monitoring funds were used to conduct the inventory. Other primary sources of funds included park base, WASO Water Resources Division, and Point Reyes National Seashore Association donations. The Network agreed to fund a portion of this work in the highest priority areas. Using seasonal biological technicians, the PORE GIS Specialist is leading the effort to map the three parks using a very fine scale resolution.

FY02 Accomplishments:

- Field crews mapped over 100 wetland units within the 2,940 acres encompassing GOGA's Redwood Creek and Rodeo Lagoon watersheds. Detailed information on plant composition, water regime, and threats were collected. Historic wetland surveys were geospatially registered for comparison with current conditions. Managers are using these data for compliance to protect wetlands and to design construction and restoration projects.

Scheduled FY03 Activity:

- Continue wetland mapping in high priority areas in GOGA. Matching funding is being sought from other sources including WRD.

Task 4.3 – Develop a Network vegetation map.

Parks involved: All

The vegetation map was identified in the Inventory Plan as an unfunded priority. A basic vegetation map is a critical need to develop regional scale landscape change monitoring.

Scheduled FY03 Activity:

- The Network Data Manager will create a draft Network vegetation map based on the California and national classification systems for use in the Network vital signs scoping process.

B. Vital Signs Monitoring

Objective 5 - Develop the organizational structure for and administer the vital signs monitoring (VSM) program in an efficient and effective manner.

The Board of Directors and Technical Steering Committee recommended a central office location and shared resources and personnel. GOGA provides office, telephone, computer support and mailbox. PORE provides administrative support including travel, time and attendance, vehicles, contracting, purchasing, and personnel.

Task 5.1 – Hire professional staff and secure office space, facilities and equipment that provide a safe and productive work environment.

FY02 Accomplishments:

- Three Network positions were identified as essential to the initial functioning of the Network and were hired.
 - The Network Database Manager began work in July 2002.
 - The Network Biological Technician began work in June 2002. These two people join the Network I&M Coordinator in an office in GOGA.
 - The Water Quality Specialist arrived in the late summer of FY02. Her office is at PORE and she is supervised by the PORE hydrologist, but will work with all SFAN parks.
- The SFAN staff moved to office space at GOGA and acquired equipment.
- The SFAN monitoring funds covered costs at PORE for administration of budget analysis and tracking, travel, time and attendance, and personnel for SFAN.
- Hired data manager for PORE in January who served as the interim Network data manager until he was hired in July.

Scheduled FY03 Activity:

- Develop an organization chart to implement the VSM program.
- Hire several seasonal biological technicians to mine and verify data.
- Seek training for network personnel in contracting, budget tracking, and other skills, as appropriate.

Task 5.2 – Form focus groups to concentrate on specific subjects.

FY02 Accomplishments:

- Three focus groups were established and met at least once.
 - Data management
 - Aquatic resources
 - Geologic resources

Scheduled FY03 Activity:

- Schedule focus groups to meet quarterly, or as needed.
- Form other focus groups including marine resources and wildlife.

Objective 6 - Develop and advance the SFAN vital signs monitoring (VSM) program in accordance with currently approved scientific methods including identification of monitoring questions, priorities, ecological indicators, measurable objectives, a sampling framework for integrated monitoring and peer review.

Task 6.1 – Summarize existing data and understanding to prepare for SFAN vital signs monitoring workshop and program.

Parks: All.

A comprehensive examination of inventories and monitoring throughout the region is needed.

FY02 Accomplishments:

- All park Resource Management Plans, General Management Plans and other park-specific documents were reviewed and used during individual park VSM workshops.
- Resource studies, including past and current inventories and monitoring, were reviewed and summarized as background information for each park VSM workshop.
- Complete WASO Inventory spreadsheet of all projects funded by the I&M program.
- Submitted Annual Accomplishments Report for FY02 and the Work Plan for FY03 in November 2002.

Scheduled FY03 Activities:

- The Network Coordinator will formally interview superintendents and key resource managers using a questionnaire to document needs and issues.
- The Network staff will interview neighboring agencies, partners and state parks to provide essential background information for future VSM workshops. Interviews will summarize current and historical monitoring programs in the region, including fire effects, threatened and endangered species, water quality, air quality, physical processes and other resources.
- The Network staff will develop a spreadsheet and report summarizing the key resources, significant issues, and on-going and past monitoring for use in the VSM workshop in February 2003 and this information will be posted on the SFAN website.

Task 6.2 – Complete individual park VSM workshops

FY02 Accomplishments:

- Three park VSM workshops were held. The information is being used in several ways: as background information, to select park monitoring

indicators, and to work with other groups/agencies in developing monitoring strategies.

- The scoping workshop for PINN was held September 2001. The workshop summary and conceptual model were developed from January through April. The summary was sent out to reputable scientists for wider peer-review. Park indicators and priorities were selected and park staff is writing the monitoring plan with assistance from the Network Coordinator.
- The scoping workshop for EUON and JOMU was combined since they are in the same ecological sub-section. The workshop was held in January 2002 with a follow-up conceptual model development workshop in early July 2002. Potential indicators were selected and prioritized. Written summaries have been sent out for peer-review.
- GOGA/PORE were combined since they are in the same ecological sub-section and jointly undertake many resource monitoring projects. A VSM workshop was previously held in 1997 to develop a conceptual model and select indicators. During that workshop the parks developed a conceptual model based on the Channel Islands Prototype Park. The July 2002 Workshop reviewed the indicators previously selected and refined the conceptual model.

Scheduled FY03 Activities:

- Complete the GOGA/PORE indicator prioritization and the workshop summary updating the Phase I Report and website.
- All information will be condensed into tables and maps as handouts and put on a website for the network VSM workshop.

Task 6.3 – Organize SFAN Vital Signs Monitoring Workshop

FY02 Accomplishments:

- Much of the background material in preparation for the VSM workshop was developed prior to, and during, each park VSM workshop.
- Information was compiled and summarized in the draft Phase I report.
- Some summary information and reports were put on the SFAN website.

Scheduled FY03 Activities:

- SFAN Technical Steering Committee will meet to revise the network conceptual model, finalize selection of monitoring indicators, and update the draft Phase I report in January 2003.
- Invite participants from adjacent land management agencies, other agencies, universities and organizations to participate in the VSM workshop to review the draft SFAN conceptual model and VSM indicators.
- Provide background information to the participants about the parks from each parks VSM workshop, and about the NPS I&M program by mailings and the SFAN website.

- Hold the workshop in February 2003. Evaluate the “what” that the parks and Steering Committee developed, then brainstorm the “how”.

Task 6.4 – Write VSM Plan from results of SFAN workshop and background information.

FY02 Accomplishments:

- The Network submitted the draft Phase I report, background summary and conceptual models for each park to WASO in October 2002.

Scheduled FY03 Activities:

- The Network I&M Coordinator will write up a summary of the VSM workshop for inclusion into the Phase I&II report by June 2003 for peer-review following the guidelines established in the Pacific West Region.
- Revise the draft Phase I report and create a SFAN conceptual model.
- Write draft Phase II report and identify and rank indicators based on information from the SFAN VSM workshop in February 2003.
- Submit Phase I&II report to WASO at end of FY03.

Objective 7 – Evaluate existing monitoring activities and develop protocols for inclusion in the VSM program

Existing monitoring projects need to be evaluated and revised before inclusion in the SFAN VSM program.

Task 7.1 – Develop protocols for SFAN indicators

Parks involved: All

Protocol development will concentrate on high priority indicators. Many protocols will be “off-the-shelf” standard protocols that only need sampling locations, schedules and frequencies. Other protocols may be new and need development and testing.

FY02 Accomplishments:

- A draft protocol was written for monitoring landbirds for SFAN parks based on national standards (Ralph et al.1993) under a cooperative agreement with Point Reyes Bird Observatory (PRBO). As part of protocol testing, neotropical songbirds were monitored at GOGA, MUWO and PORE using NPS Wildland Urban Interface funds and National Park Foundation - Park Flight funds, and augmented with I&M funds. A total of 4,349 birds were caught and banded on federal lands, including 87 different species.
- SFAN identified as a task in the FY01 workplan assessing a network-wide protocol for monitoring multi-species terrestrial vertebrates but was unable to achieve this task because we decided to coordinate this activity with other networks in the PW Region and because the primary researchers (Dr. Robert Fisher and Dr. Curt Jenkins) were not available until FY03.
- SFAN identified as a task in the FY01 workplan developing a network-wide protocol for monitoring rare plants but was unable to achieve this task until

inventories of rare plants on new lands of PINN and GOGA are completed in FY04.

Scheduled FY03 Activities:

- Examine and hold a workshop to evaluate the potential use of the USGS-BRD a multi-species terrestrial vertebrate sampling array method for monitoring mammals, reptiles and amphibians.
- Develop a protocol for monitoring landscape level change (Network Data Manager as the lead).

Task 7.2 – Evaluate monitoring of raptors

Parks involved: PINN

FY02 Accomplishments:

- Funds from the I&M program augmented existing monitoring funds from several other sources, including park base to monitor raptors. The prairie falcons in the park are a source population for adjacent areas. During the 16th year of monitoring, 8 active breeding prairie falcon territories were confirmed. Twenty-six prairie falcons hatched and 22 were confirmed to have fledged.
- Nine adult prairie falcons were captured, banded and fitted with radio-tracking equipment for a research project on foraging habitat and patterns.
- Golden eagles were observed throughout the park. One nest outside the park produced two eaglets.

Scheduled FY03 Activities:

- A draft protocol for PINN will be developed based on national protocols, but modified to address the research questions of the I&M program for the SFAN.
- Continue to monitor raptors and guide park management adaptively.

Task 7.3 – Evaluate monitoring of northern spotted owls.

Parks involved: GOGA, PORE, MUWO

FY02 Accomplishments:

- Funds from the I&M program augmented existing monitoring. Other funding sources included park base, NPS Wildland Urban Interface and donations. Monitoring of northern spotted owls was implemented in 1995 at GOGA, MUWO and PORE. This is a region-wide program with collaborators such as PRBO, the Marin Municipal Water District, Marin County Open Space District, the California Department of State Parks, and the REO of the Northwest Forest Plan (NWFP).
- Preliminary data for FY02 indicate that there were 29 pairs and 17 fledglings in the 3 parks.

FY03 Activities:

- A draft protocol for GOGA, PORE and MUWO will be written based on the national NWFP and USFWS protocol, but modified to address the research questions of the I&M program for the SFAN.
- Continue to monitor and guide park management adaptively.

Task 7.4 – Evaluate monitoring of Western Snowy Plovers.

Parks involved: GOGA, PORE

FY02 Accomplishments:

- Funds from the I&M program augmented existing monitoring funds from several other sources including park base, PW Region, Point Reyes National Seashore Association and USFWS. Western snowy plovers, a threatened species, have been monitored at PORE since the 1970's and at GOGA since the 1990's. Monitoring documented a dramatic decline of nesting success at PORE. In response, the park now erects exclosures around many nests to protect eggs and newly hatched chicks. Monitoring data now indicate that fledging success increased in 2002; however, predation of chicks remains high.

Scheduled FY03 Activities:

- A draft protocol for GOGA and PORE will be developed based on the national USFWS protocols, but modified to address the research questions of the I&M program for the SFAN.
- Continue to monitor western snowy plovers and guide park management adaptively.

Task 7.5 – Evaluate monitoring of salmonids and associated fish assemblages.

Parks involved: GOGA, PORE, MUWO

FY02 Accomplishments:

- Funds from the I&M program augment existing monitoring. Other primary sources of funds include park base, National Marine Fisheries Service (NMFS), California Department of Fish and Game (CDFG), and donations. This is a regional monitoring program in cooperation with NMFS and CDFG. Over 250 coho smolt left Pine Gulch Creek watershed in 2002. Until the previous year, no coho had been documented in this creek since 1968. In addition, for the first time, 25 coho salmon juveniles were documented at the Stinson Beach, Easkoot Creek monitoring location.
- During sampling for salmonids, crews documented a tidewater goby (federally threatened) within the Tomales Bay watershed for the first time since 1950.

FY03 Activities:

- A draft protocol for GOGA, PORE and MUWO will be developed based on the national NMFS protocols, but modified to address the research questions of the I&M program for the SFAN.
- Continue to monitor and guide park management adaptively.

Task 7.6 – Evaluate monitoring of pinnipeds.

Parks involved: GOGA, PORE

FY02 Accomplishments:

- Funds from the I&M program augmented existing monitoring. Other sources of funds include park base, NOAA, and donations. This project is a collaboration with the NMFS, CDFG and the National Marine Sanctuary Program.
 - The number of northern elephant seal pups born at PORE continued to increase to 423, the highest number in 22 years of monitoring. The number of pupping locations remained unchanged at six. One flipper-tagged seal from PORE was sighted in Russia in the summers of 2001 and 2002.
 - Harbor seal populations remained stable over the past two years. A total of over 4000 seals including around 1075 pups were counted at 12 locations. Over 30 trained volunteers surveyed seals contributing an average of 54 hours per person and totaling over 1500 hours.
 - Both of these projects are collaborations with the National Marine Fisheries Service (NMFS) and the National Marine Sanctuary program.
 - NMFS conducted a workshop in August on methods for annual surveys with PORE providing ground truthing data to aerial surveys.
 - A draft protocol is being written by researchers from Oikonos, a non-profit research group, for monitoring pinnipeds, including productivity and mortality of harbor and elephant seals. Monitoring of pinnipeds is part of a larger national program established by NMFS but the protocol is modified to address the research questions of the I&M program for the SFAN.

Scheduled FY03 Activities:

- Test draft protocol developed in FY02.
- Complete 5-year report on northern elephant seal monitoring.
- Continue to monitor pinnipeds and guide park management adaptively.

Task 7.7 Evaluate monitoring of feral pigs

Parks involved: PINN

Funds for this monitoring are predominantly from other sources.

FY02 Accomplishments:

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- Continue to monitor feral pigs and guide park management adaptively.

Task 7.8 – Evaluate monitoring of coastal species in the rocky intertidal zone.

Parks involved: GOGA, PORE

FY02 Accomplishments:

- Initiated the evaluation of the NPS long-term monitoring of coastal intertidal species at PORE and GOGA. This project was established in 1995 based on the Channel Islands NP long-term intertidal monitoring program.

Met with NOAA, the UC Bodega Marine Lab and the research group, Partnership for the Interdisciplinary Study of Coastal Oceans (PISCO) to seek guidance in standardization of a protocol in California.

Scheduled FY03 Activity:

- Contract for analysis with PISCO, or UC Bodega Marine Lab, of the coastal intertidal data and protocols to provide recommendations for VSM for the SFAN.

Task 7.9 – Evaluate monitoring of rare butterflies.

Parks involved: PINN, GOGA, PORE

Funds for this monitoring are predominantly from other sources.

FY02 Accomplishments:

- PINN conducted the 3rd annual butterfly count in coordination with the North American Butterfly Association. Four new butterfly species were recorded in the Monument bringing the total to 67 species. Developed a database structure for the endangered Myrtle's Silverspot butterfly monitoring project at PORE.

Scheduled FY03 Activities:

- Protocols for PINN will be developed based on the North American Butterfly Association protocols, but modified to address the research questions of the I&M program for the SFAN.

Objective 8 – Implement SFAN VSM program after protocols have been peer-reviewed and approved. Apply monitoring data to adaptively guide park management of species and ecosystems.

Parks in the SFAN are at an uneven stage of development in VSM. This objective, therefore, is to focus on bringing parks up to a comparable level while augmenting already active programs. GOGA, PORE, MUWO and FOPO, for example, held a VSM workshop in 1996 and developed a draft inventory and monitoring plan in 1997, including a conceptual model designed after the Channel Islands NP prototype park. Over the subsequent years, the parks had jointly initiated monitoring of several prioritized “vital signs” indicators identified in that plan with park base funds, national funds and donations (see Objective 7). Once a draft SFAN VSM program is developed, these GOGA/PORE indicators will be folded in it.

FY02 activities:

- Developed a draft database for current monitoring programs and projects for all parks.
- See Objective 7 for examples of legacy monitoring projects that will be folded into the VSM program and that were augmented in FY02 with I&M funds.
- Monitoring data collected by the neotropical landbird monitoring program were used to adaptively guide parks to protect nesting birds in areas where park-related projects were administered including the Cape Ivy Eradication project, the Coho Salmon Restoration Project and routine trail maintenance.

- Monitoring data collected by the raptor monitoring program were used to adaptively guide PINN to protect key nesting areas from recreational rock climbers.
- Monitoring data collected by the spotted owl monitoring program were used to guide park management in routine trail maintenance activities.
- Monitoring data collected by the salmonid monitoring program were used to adaptively guide parks to restore key streams for spawning salmonids.
- Monitoring data collected by the pinniped monitoring program were used to adaptively guide parks to improve protection of breeding sites from human disturbance and to develop NMFS national stock assessments.

Scheduled FY03 Activities:

- Write a Draft Data Management Plan for peer-review.
- Develop a final database and an overall management structure for all current monitoring data for all parks.
- Establish archival procedures for all data.
- Implement QC/QA measures for all FY03 projects.
- Continue to use monitoring data to guide park management.

C. Water Quality Monitoring

Many of the park units within the Network have completed some level of land use assessment and water quality monitoring. Since three water bodies in the network are currently listed as impaired waters, which ones continued monitoring (before the long-term monitoring plan is developed) is crucial. Developing a long-term water quality monitoring plan will be a critical step in reducing impairment and guiding management decisions within the parks. In 2001, the SFAN water resources professionals developed a workplan for a Network Water Quality Specialist to be hired in FY02. The water quality specialist will be responsible for developing the SFAN Water Quality Monitoring Plan, integrating it with the overall VSM Plan, and coordinating existing monitoring efforts.

Objective 9 - Coordinate development and approval of a long-term water quality monitoring program for the SFAN.

Task 9.1 – Hire a water quality specialist to coordinate with the Water Resources Division and develop the network water quality monitoring plan

FY02 Accomplishments:

- A Network water quality specialist was hired in late July FY02.
- The water quality specialist initiated an intensive review of park water resources in order to obtain an understanding of the watersheds within the network. This review provided a foundation for developing the introduction and background for Phase I of the water quality monitoring plan.
- Data was gathered through field reconnaissance to each park and informal discussions with park natural resources staff.

- In addition, a review of numerous scientific and guidance documents from the State Water Resources Control Board, NPS, EPA, and others was conducted.

Scheduled FY03 Activities and Products:

- The Water Quality Specialist will attend the WRD Water Resources Professionals meeting in November. This will provide an opportunity to gain additional guidance and share ideas related to developing a long-term water quality monitoring program. This meeting may also provide an opportunity to gain insight on how to combine service-wide and network based goals.

Task 9.2 – Document existing water resource designations for parks within the network

FY02 Accomplishments:

- Information on the beneficial uses of streams within network parks was obtained by reviewing the Regional Water Quality Control Board Basin Plan.
- Network water bodies listed as impaired (by Section 303d) were identified.
- Information was gathered on Outstanding Natural Resource Waters and Areas of Special Biological Significance (state designation). No ONRWs exist in the network; four ASBS exist in the network (PORE).

Scheduled FY03 Activities and Products:

- Continue documenting water resource designations and provide input to state agencies regarding these designations.
- Map existing designated beneficial uses, impaired waters, and ASBS.

Task 9.3 – Conduct data mining and determine the status of historic and existing water quality monitoring data.

FY 02 Accomplishments:

- The aquatic professionals group contracted with a UC Berkeley professor to have a graduate student analyze existing data (PINN, GOGA, PORE). The student has been tasked to assist (through data mining and literature review) in answering specific questions related to water quality indicators and monitoring protocols.
- An inventory of existing park water quality data (gathered by NPS and other agencies) was initiated in order to gain knowledge of data characteristics such as timing and location of monitoring, parameters monitored, data storage techniques, etc. A large amount of data from several years, for several parameters and locations exists for these parks. A biotech was hired to assist in the data mining.

Scheduled FY03 Activities and Products:

- The Water Resources Division Baseline Water Quality Data Inventory and Analysis reports will be reviewed for JOMU and EUON and for PORE, PINN, and GOGA as they are received.
- Coordination with the UC Berkeley graduate student will continue and a report is anticipated in the spring.
- An inventory of existing park data will be completed.

Task 9.4 – Meet with resource managers that are involved in maintaining water resources within the SFAN parks.

FY02 Accomplishments:

- Members of the SFAN aquatic professionals group met with the San Francisco Bay Regional Water Quality Control Board, the Shellfish Technical Advisory Committee, and Tomales Bay Watershed Council to discuss impairment issues in watersheds within PORE and GOGA.

Scheduled FY03 Activities:

- Continue discussions with Regional Board staff to determine how to reduce impairment (participate in the TMDL development process) and to coordinate monitoring efforts.
- Hold scoping meetings at each park (to be attended by park staff, watershed councils, regional board representatives, and potentially other stakeholders). These meetings will provide a forum for discussing water quality issues and understanding park management objectives. The meetings will produce lists of priority water bodies and pollutants to be monitored.
- Internal scoping will be divided into five meetings including EUON/JOMU, GOGA/MUWO, PRES, PINN, and PORE.
- Coordinate external scoping meeting for technical review of water quality monitoring plan development. This will be later in FY03 after a thorough review of existing data and protocols has produced questions requiring greater technical expertise. This could involve WRD staff, local University staff, and other state and Federal agencies (USGS, etc.).

Task 9.5-- Synthesize existing water quality monitoring data for each park unit and determine the utility of the data.

Scheduled FY03 Activities:

- Begin analyzing existing water quality data (GOGA, PINN, PORE). The goal of this task is to determine whether there are data gaps, extraneous data, ineffective or uncertain protocols, or other impediments to monitoring. Another goal is to determine whether or not the data can be utilized to answer management questions.

Task 9.6 - Assist with coordination of spatial data management

Scheduled FY03 Activities:

- Assist with establishment of the SFAN water quality monitoring database.
- Facilitate acquisition and compilation of accurate metadata.
- Help ensure database compatibility with the EPA STORET database.
- Coordinate with WRD database management staff.

Task 9.7 – Synthesize existing weather information for each park unit

Scheduled FY03 Activities:

- Coordinate with the network data manager on weather data mining activities and database development.

Objective 10 - Establish and maintain long-term meteorological and hydrologic monitoring sites

Task 10.1- Install and maintain full weather stations, water level monitors, and sediment monitoring stations

FY02 Accomplishments:

- Existing hydrologic stations were maintained at PORE and GOGA.
- Existing weather stations were maintained at PORE and PINN.

Scheduled FY03 Activities and Products:

- A water level monitor will be installed at JOMU. This is one of the smaller parks in the network and has had no previous monitoring within the park boundaries. Installing a stream gauge is the first step in establishing a long-term water quality monitoring station.
- Weather stations will be installed at EUON, JOMU, GOGA, and PORE. These stations will monitor temperature, humidity, wind speed and direction, and rainfall. This data could be useful to the entire Vital Signs Monitoring program in identifying trends related to water and habitat availability, distribution of flora and fauna, flooding, fire, and many other natural processes.
- Install Turbidity Threshold Sampling unit (PORE) and receive training for installation and implementation of Turbidity Threshold Stations (Graham Matthews & Associates). Two water bodies at PORE are listed as impaired by sediment. Turbidity threshold sampling will be useful in monitoring sediment pollution more accurately and effectively and potentially aiding in sediment reduction in these impaired watersheds.

Objective 11 - Support existing park water quality monitoring programs and integrate with the VSM Plan

Task 11.1 Quarterly sampling at SFBN parks that have on-going monitoring.

Scheduled FY03 Activities:

- Continue quarterly and storm-event related sampling at PORE,
- Sample winter storm events at PINN,
- Sample for project specific needs (if necessary) at GOGA.
- Obtain initial observations of storm events and watershed responses at JOMU, PRES, and EUON.

D. Other Biological Inventories

Parks individually and collectively in the SFAN have pursued inventories independently of the I&M program for varied purposes that were funded from other sources. These studies expand upon and reinforce the objectives of the service-wide I&M program.

Objective 12 – Conduct an All Taxa Biodiversity Inventory (ATBI) of Tomales Bay **Parks involved: PORE, GOGA**

The ATBI of Tomales Bay, initiated in 1999, is an all species inventory modeled after the Great Smokies NP ATBI. The project in Tomales Bay is a community based endeavor to preserve, protect and restore the ecological integrity of Tomales Bay, to form a foundation for scientific and public policy to address threats to the bay, and to raise public consciousness on effective stewardship of coastal lands. The ATBI program is augmenting and integrating information, methods and out puts with the SFAN I&M program.

Some program objectives include:

- Complete a comprehensive checklist of life forms in Tomales Bay
- Consolidate existing and new information into a single database with GIS
- Conduct an inventory of biological taxa including:
 - Fish
 - Benthic and intertidal organisms
 - Mammals and birds
 - Vascular and non-vascular plants
 - Plankton
- Create distribution maps for species of interest (e.g. rare, abundant or non-native).
- Synthesize information and provide to scientists, educators, land managers and all other interested parties.

FY02 Accomplishments:

- The Pacific Coast Learning Center Director, an NPS position, acted as interim coordinator of the ATBI.
- Secured @\$100,000 funding from several sources to hire a data manager to assemble existing information and to support field sampling.
- Dr. Ted Grosholz of UC Bodega Marine Lab conducted an initial inventory of benthic invertebrates at selected locations in Tomales Bay.
- Dr. Mike McGowan of San Francisco State University completed a draft species list of fishes that would likely occur in Tomales Bay.

Scheduled FY03 Activities:

- Hire a data manager who will collaborate with the SFAN data manager.
- Dr. Ted Grosholz will lead a bioblitz of benthic invertebrates with graduate students and high school students in the winter of 2003.
- Sonoma State University students will lead a bioblitz of algal plants.
- Dr. Mike McGowan will survey fishes using various methods in Tomales Bay working with graduate students.

- Dr. John Kelly will provide a checklist of waterbirds and shorebirds (these data were collected in 1999-2000 with funds from the I&M program).

Objective 13 – Initiate terrestrial invertebrate surveys.

Terrestrial invertebrates are fundamental to the functioning of terrestrial ecosystems as either grazers on plants, as parasites or as prey items of terrestrial vertebrates. Consequently, the SFAN parks are seeking funds from other sources to initiate inventories of targeted groups of invertebrates.

FY03 Activities:

- Complete hymenoptera inventory of JOMU that was initiated in FY02 with funds from the PW Region.
- Initiate Lepidoptera inventory at JOMU.

III. Staff

Board of Directors

Glenn Fuller, Superintendent, John Muir NHS and Eugene O'Neill NHS
Cicely Muldoon, Superintendent, Pinnacles NM
Don Neubacher, Superintendent, Point Reyes NS
Brian O'Neill, Superintendent, Golden Gate NRA

Ad Hoc Members:

J. Bjork, Network Coordinator
Penelope Latham, I&M Coordinator, Pacific West Region

Network Technical Steering Committee

Dawn Adams, Point Reyes I&M Coordinator
Sarah Allen, Network and PWR Science Advisor
Jennifer Bjork, Network Coordinator
Mary Coopridge, Network Water Quality Specialist
Amy Fesnock, Pinnacles Wildlife Biologist
Daphne Hatch, Golden Gate Chief of Resource Management
Susan O'Neill, Network Biological Technician and representative for JOMU/EUON
Brian Witcher, Network Data Manager

Alternates and advisors to the Steering Committee

Darren Fong, Golden Gate Aquatic Ecologist
Brannon Ketcham, Point Reyes Hydrologist
Tom Leatherman, Pinnacles Chief of Resource Management
Chad Moore, Pinnacles Geomorphologist
Dale Roberts, Point Reyes Data Manager
Dave Schirokauer, Point Reyes GIS Biologist
Craig Scott, Golden Gate GIS Specialist

I&M Network Staff

Jennifer Bjork, Network Coordinator

Mary Coopridger, Network Water Quality Specialist
Susan O'Neil, Network Biological Technician
Brian Witcher, Network Data Manager

IV. Public Interest Highlights

- ✓ Twenty-four new vascular plant species were discovered on the newly acquired lands at Pinnacles NM. One of them, a mustard species, is new to science!
 - ✓ Twenty-three rare plant populations were discovered at Point Reyes during two "Rare Plant-a-Thons." Two new species were added to PORE's plant list.
 - ✓ The federally endangered California freshwater shrimp and the threatened tidewater goby were discovered at PORE and represent new areas in the State of California for the species.
 - ✓ The sighting of coho salmon adults spawning in a creek draining into Bolinas Lagoon was the first such sighting in 30 years!
 - ✓ Northern elephant seal pup births reached 423 in 2002 and is the highest number recorded in 22 years of monitoring at PORE. A seal flipper-tagged as a pup at PORE in 2000 was seen on a remote island in Russia (3,800 km distance) in 2001 and again in 2002.
 - ✓ The streams at PINN are still free of exotic fish providing improved chances for red-legged frog survival.
 - ✓ Point Reyes Bird Observatory banded 4,349 neotropical migratory songbirds on federal lands in GOGA and PORE, including 87 species. Long-term monitoring shows a sustained downward trend of this species assemblage, especially for Wilson's warbler, song sparrows, wrentits, and white-crowned sparrows.
 - ✓ Multi-species vertebrate inventories at GOGA and PORE collected over 7,485 identifiable photographs of wildlife, and captured 3,920 vertebrates in Sherman traps and 4,597 vertebrates in pitfall traps. Thirty-one species of mammal, nine of reptile and seven of amphibian were identified for a total of 47 species of terrestrial vertebrates. One new species, the western skink was added to the park species list for PORE.
 - ✓ Two new colonies of Ashy Storm-petrel seabirds were discovered at PORE, which represent about 10% of the world population.
 - ✓ Information gathered by the I&M program are being used to identify potential marine protected areas in central California.
-
- Two "Rare-Plant-A-Thons" at PORE demonstrated that volunteers can help with inventories with a little training and with dynamic, knowledgeable group leaders. Volunteers included AmeriCorps volunteers, members of the GOGA and PORE Habitat Restoration Team, University professors and a 9-year old "junior botanist." Volunteers traveled from as far as Davis, Sacramento and San Francisco. Over the year, 23 unrecorded rare plant populations were located on the 71,000-acre Seashore lands. Two of these were new additions to the Seashore, the endangered Robust spineflower (*Chorizanthe robusta*) and the Coast morning glory (*Calystegia purpurata* spp. *Saxicola*). This type of effort

demonstrates that a hiker can't walk far off trail in PORE without encountering some sort of rare plant species!

- Using information gathered through the I&M program, SFAN personnel collaborated to assist JOMU, a small park, with an urgent natural resource need. Downstream of a dry creek in JOMU is a neighborhood that floods during high rain events bringing sediment into garages and lower portions of homes. Technical specialists from PINN, GOGA and PORE applied information completed by the natural resource inventory in the creek. This study will be used by the Superintendent in an engineering and mitigation plan to protect downstream neighbors and park resources.
- Terrestrial vertebrate species were sampled at all parks except PINN using a multi-species sampling array that includes pitfall traps, snake traps, cover boards, Sherman traps and cameras to document the presence/absence of species in different habitat types. This method was designed by Dr. Robert Fisher of USGS-BRD and modified to meet the habitat conditions of the various parks. Arrays were stratified by 8 habitat types at PORE and GOGA. Over 7,485 identifiable photographs of wildlife were collected. Over 24,072 checks of Sherman traps yielded 3,920 captures and 28,952 checks of pitfall traps yielded 4,597 captures. Thirty-one species of mammal, nine of reptile and seven of amphibian were identified for a total of 47 species of terrestrial vertebrates. One new species, the western skink was added to the park species list for PORE. Habitat associations and seasonal changes in species composition and abundance were determined for several species. More species occurred in ungrazed than in grazed habitats.
- Local citizens protect seals at PORE and GOGA through a long-term monitoring program. Currently, volunteers conduct all monitoring of seals at the parks. More than 100 volunteers were trained under three different programs administered by two agencies (NPS and NOAA) in FY02 and have been monitoring seals collaboratively, providing information to guide management. NPS volunteers spent over 1800 hours surveying seals, and 2000 hours educating park visitors and protecting seals. The park has used the information to manage adaptively by establishing seasonal protection periods at key pupping locations of the seals. For example, from long-term monitoring of harbor seals at Drakes Estero, biologists were able to determine that pupping rates declined with increased use by recreational kayakers. The park responded by working with kayakers to close the estero during the harbor seal pupping season but to open the estero during the non-pupping season. As a consequence, seal pupping rates rebounded within two years.
- The marine ecosystem inventory at SFAN is evolving from a synthesis of programs developed by Glacier Bay NP, Channel Islands NP, and other agencies. PORE and GOGA are collaborating with NOAA, National Marine Sanctuaries Program, Moss Landing Marine Laboratory and the Department of Fish and

Game to ensure that a regional and national standard is implemented. These data are being used to identify marine protected areas in central California.

- The coastal biological resources inventory at SFAN adopted the Glacier Bay NP method of characterizing coastline by combining mapping, habitat characterization and an inventory of biological features.
- Although CHIS has guided the fundamental approach for inventorying and developing monitoring programs in the marine ecosystem, much modification of the sampling methods and stratification is required for the mainland coastal marine system. So SFAN are collaborating with PISCO and NOAA to review the parks existing intertidal monitoring program.
- USGS will be providing LIDAR mapping to provide reference data on the shoreline characterization and position.
- USGS along with Moss Landing Marine Laboratory will be using side scan sonar to map and characterize the sea floor location and substrate of key areas of the parks, providing a habitat analysis of benthic species.

For more information, see Appendix A.

V. Reports, Publications, Presentations

Reports

Abbott, S. 2002. The effects of extreme high tides on nesting success and habitat availability for snowy plovers at Point Reyes NS. Point Reyes Bird Observatory Contribution Number 986.

Abbott, S. and C. Peterlein. 2002. Distribution, protection and reproductive success of snowy plovers at Point Reyes National Seashore. Point Reyes Bird Observatory contribution number 982.

Allen, S., S. Waber, and D. Press. 2002. Long-term monitoring of harbor seals at Point Reyes, California: five year annual report 1997-2001. National Park Service Report.

Benson, S. and M. Coppoletta. 2002. Rare plant program summary for FY2002. National Park Service report.

Fellers, G., L. Long, and D. Pratt. 2002. Inventories of terrestrial vertebrates at JOMU and EUON – 2001 annual report. Interim report by USGS-BRD. 14pp.

Fellers, G., and D. Pratt. 2002. Terrestrial vertebrate inventory, 1998-2001. Final Report by USGS-BRD. 71 pp.

Fehring, K., D. Adams, and D. Hatch. 2002. Northern spotted owls in Marin County, 2001. Annual Report to the NPS.

Whitworth, D., H. Carter, R. Young, G. McChesney, M. Hester and S. Allen. 2002. Status and distribution of the Ashy Storm-petrel at Point Reyes National Seashore, California, in 2002. Final Report to the NPS.

Presentations

Allen, S. 2002. Selection criteria of marine protected areas in the Gulf of the Farallones. American Fisheries Society Meeting in Tahoe City, California.

Bjork, Jennifer. April, 2002. San Francisco Bay Area Network I&M Program. At North by Northwest Conference, Seattle, Washington

Bjork, Jennifer. Aug, 2002. San Francisco Bay Area Network Proposed Conceptual Model. At 2nd Annual I&M Meeting, Denver, Colorado.

Schirokauer, Dave. April, 2001. Land-cover mapping and wetlands delineation at Point Reyes National Seashore. George Wright Society, Denver, Colorado.

Weber, S. and S. Allen. 2002. Monitoring Protocols: what, where and how. Presentation at North by Northwest Conference, Seattle, Washington.

Witcher, Brian. July, 2002. Land use change beyond the park boundary. At ESRI Users Conference, San Diego, California.

Posters

Schirokauer, Dave. July, 2002. Comparative wetlands mapping. ERSI Users Conference, San Diego, California.

Schirokauer, Dave. Sept., 2002. Comparative wetlands mapping in Point Reyes National Seashore and Golden Gate National Recreation Area. Society for Wetlands Scientists, Tiburon, California.

VI. Status of Park Vital Signs Monitoring

Park specific scoping workshops are completed. PINN scoping began in September 2001, followed by EUON/JOMU in the spring and FOPO/GOGA/MUWO/PORE/PRES in July 2002. All workshop summaries and conceptual models are undergoing local peer review except for the GOGA/PORE one, which is still being written.

Network planning is underway for the VSM Workshop in February 2003. The Draft Phase I Report was submitted in October 2002. The Phase I Report is the first step in the monitoring plan and covers park resource background information and the conceptual models. This report will be revised in FY03. After the VSM workshop, the draft Phase II report will be written and the draft Phase I&II report will be submitted to WASO at the end of FY03.

Table 1: Status of Vital Signs Monitoring:

Although eight parks in the SFAN (FOPO, GOGA, JOMU, MUWO, PINN, PORE, EUON, and the Presidio) are monitoring natural resources, we present here only the six parks identified by WASO (excluding EUON and PRES) as having significant natural resources in all seven categories. PINN and JOMU have made decisions and prioritized the components that they will monitor. PORE and the GOGA group are in the process of selecting final indicators. Several parks are already doing some monitoring as reflected in the “protocols implemented” and “analysis/synthesis available” sections. The water quality program is beginning the planning process.

San Francisco Area Network Vital Signs Monitoring	Air Quality	Water Quality	Water Quantity	Geologic Resources	Plants	Animals	Landscape Characteristics
PLANNING & DESIGN							
# of parks monitoring w/Network funding	6	6	6	6	6	6	6
# of parks monitoring w/other funding	5	5	4	4	5	5	4
PROTOCOLS IMPLEMENTED							
# of parks monitoring w/Network funding	0	0	0	0	0	4	4
# of parks monitoring w/other funding	2	1	2	0	2	4	4
ANALYSIS/ SYNTHESIS AVAILABLE							
# of parks monitoring w/Network funding	0	0	0	0	0	0	0
# of parks monitoring w/other funding	2	1	0	0	0	3	0

VII. Budget

Budget Narrative

FY02

The Network received **\$131,870** from the service-wide I&M Program for biological inventories. Fourteen projects were supported, either fully or partially, with these funds and augmented with monitoring funds.

- Eleven multi-year inventories were continued – multi-species terrestrial vertebrates at PORE/GOGA and JOMU/EUON, bats at all parks, vascular plants at JOMU, vegetation mapping at GOGA, MUWO, FOPO and PORE, landbirds at JOMU, EUON and PINN, rare plants at PORE and GOGA, coastal biological resources at GOGA and PORE, and herbarium assessment, aquatic riparian species at PINN.
- Three new inventories were initiated – vascular plant inventory on new lands at PINN, data mining for aquatic resources, coastal biological resources inventory subset - nearshore fishes at GOGA and PORE, and the salt marsh harvest mouse at GOGA.
- The Network Data Manager, a permanent GS-11, began work in July.

The SFAN monitoring funds (**\$592,800**) were allocated for salary, VSM workshops, training, a few inventory projects identified in the SFAN Inventory Plan, and augmenting a few legacy long-term monitoring projects.

- The budget provided salaries for the Network Coordinator and the Network Biological Technician, operations and travel. Travel expenses included travel expense of network staff amongst the parks, park specific workshops, participation in the national I&M workshop and the I&M database workshop in August, the WxNW conference, and ESRI conference presentation.
- Administrative expenses were slightly over the 10% guidance suggested by the Servicewide program. Excluding salaries for Network personnel, the Network spent \$75,243 (10.3%) instead of \$72,4670 (10%). The Network paid for 1/4 of the PORE budget analyst's salary (\$6,025) for which we received a person to track and maintain budget entries in AFS and do travel for Network personnel. The additional \$9,000 to PORE supported purchasing, acquiring and tracking vehicles, personnel actions, and contracting (including 17 contracts, cooperative agreements or interagency agreements). Additional expenses were for furniture, phones, installation of computer lines, two vehicles, two laptop computers, office supplies for 3, and safety kits for cars and field packs (\$60,218). Much of that was a one-time expense for office set-up.
- The main task was to complete the vital signs scoping workshops, conceptual model development and indicator selection for all of the parks. Funds were allocated to develop protocols for terrestrial neotropical songbirds for the network and for pinnipeds at PORE and GOGA.
- A third task was to support the completion of several inventories and accelerate vegetation mapping projects – (in addition to above under inventory funds) accuracy assessment of GOGA/PORE/MUWO vegetation map, vegetation mapping at PINN, wetlands mapping at GOGA, Ashy Storm-petrel inventory, and California freshwater shrimp inventory.
- The final task was to augment a few long-term monitoring projects since they were previously identified as VSM indicators – neotropical songbird reproduction at GOGA and PORE, northern spotted owl population at GOGA, PORE and MUWO, pinnipeds at PORE and GOGA, western snowy plovers at GOGA and PORE, salmonid productivity at MUWO, PORE and GOGA and raptor productivity at PINN.

In FY02, the Network received **\$70,000** from the Water Resources Division for water resource monitoring.

- A cooperative agreement for technical assistance was completed and monitoring equipment was purchased.
- The network water quality monitoring specialist was hired.

FY03

The Network anticipates receiving \$147,839 from the service-wide I&M Program for inventories. All projects that were approved in the Inventory Study Plan will have been started, are in progress or will be completed by year end of FY03. Priorities for these

funds are to complete multi-year inventories and to initiate the last two projects in the

In FY03, the SFAN anticipates receiving \$70,000 from the Water Resources Division. The bulk of the funding will provide for the salary of the Water Quality Specialist.

Inventory Study Plan (small mammal/herpetofauna inventory for PINN and the sub-tidal/deepwater inventory for PORE/GOGA).

The Network also anticipates receiving the first year of full VSM funding - \$742,800. The funding will be used for four main tasks:

- Prepare for Phase II report of the draft VSM Plan that includes network VSM workshop and outside review by CESU scientists at University of California and others.
- Conduct additional inventories of species or species assemblages identified in the Inventory Plan.
- Augment existing monitoring while evaluating existing data sets and developing protocols.
- Maintain network staff and hire several new positions (data managers for three parks and several seasonal biological technicians).

References:

Cincotta, R.P. and R. Engelman. 2000. *Nature's Place, Human Population and the Future of Biological Diversity*. Population Action International, Washington, D.C. 80 pgs.

The Nature Conservancy. *Precious Heritage: The Status of Biodiversity in the United States*. Edited by Bruce A. Stein, Lynn S. Kutner, and Jonathan S. Adams for The Nature Conservancy and Association for Biodiversity Information. 416 pages; Oxford University Press, Inc., 2000.

Press, D. and M. Irving-Seminoff. 2000. *A study plan to inventory biotic resources at the San Francisco Bay Area National Parks*. Final Report to the NPS.

Ralph, C.J., G.R. Geupel, P. Pyle, T.E. Martin, and D.F. DeSante. 1993. *Field methods for monitoring landbirds*. USDA Forest Service publication, PSW-GTR 144, Albany, CA.

White, Jennifer D. *Bird Inventory of Three National Parks of the San Francisco Bay Area: Wintering Waterbirds and Shorebirds*. Point Reyes Bird Observatory. 1999. 40 pages.

Yoklavich, M.M., Starr, R. Steger, J., Greene, H.G., Schwing, F. and Malzone, C., 1997. Mapping benthic habitats and ocean currents in the vicinity of central Big Creek Ecological Reserve. NOAA Tech. Memo. NOAA-TM-NMFS-SWFSC-245, 52 p.

Appendix A: Public Interest Highlights

- The “Rare-Plant-A-Thons” at PORE have demonstrated that volunteers can help with inventories with a little training and with dynamic, knowledgeable group leaders. Volunteers had a wide range of experience and included AmeriCorps volunteers, members of the PORE Habitat Restoration Team, University professors and a 9-year old “junior botanist.” Volunteers traveled from as far as Davis, Sacramento and San Francisco. Over the year, 23 unrecorded rare plant populations were located on the 71,000-acre Seashore lands. Two of these were new additions to PORE, the endangered Robust spineflower (*Chorizanthe robusta*) and the coast morning glory (*Calystegia purpurata* spp. *Saxicola*). This type of effort demonstrates that a hiker can’t walk far off trail in PORE without encountering some sort of rare plant species!
- Monitoring of northern spotted owls was implemented in 1998 at GOGA, MUWO and PORE. Collaborators include the Point Reyes Bird Observatory, Marin Municipal Water District, Marin Open Space District and the California Department of State Parks. Preliminary data from 32 sites within federal lands in 2002 indicate that of 29 pairs, 17 fledged young in 2002. A total of 23 fledglings from all sites were reported, adding to an overall seasonal fecundity of 0.41, which is about average for this population. Biologists banded a total of ten new adults and 19 fledglings. Resight data from banded birds will yield information on survivorship, dispersal of young, and movement of adults. Although GOGA/PORE are the southern edge of the range for this threatened species, monitoring data indicate that they support the highest density in the world for the species and that the population is stable.
- GOGA’s Redwood Creek and Rodeo Lagoon watersheds were selected for enhanced wetland mapping. Using GPS units, field crews mapped over 100 wetland units within the 2,940 acres encompassing these watersheds. Detailed information on plant composition, water regime and threats were collected. Historic wetland surveys of Big Lagoon on Lower Redwood Creek and of Rodeo Lagoon were geospatially registered for comparison with current conditions. Managers will use these data to design construction and restoration projects.
- The 2002 breeding season was the 16th year of raptor monitoring at PINN. Eight active breeding prairie falcon territories were confirmed. Twenty-six prairie falcons hatched with twenty-two confirmed fledged. Two territories failed, one assumed by predation and the other, for unknown reasons. Nine adult prairie falcons were captured, banded and fitted with radio-tracking equipment for a research project on foraging habitat and patterns. The prairie falcons within the park are a source population for adjacent areas. Golden eagles were observed throughout the park. Several known nests inside the park were not occupied and one nest outside the park produced two eaglets.

- During the 2nd year of the PINN aquatic riparian inventory, 700 aquatic invertebrates and 150 dragonflies and damselflies were collected. All sections of flowing streams were surveyed for reptiles, amphibians and fish. The streams and reservoir remain free of exotic fish. Final distribution maps are being completed.
- PINN conducted the 3rd annual butterfly count in coordination with the North American Butterfly Association, involving the public. Four new butterfly species were recorded in the Monument, bringing the total to 67 species.
- The vascular plant inventory was initiated on the newly acquired lands for PINN from the Bureau of Land Management. Twenty-four new plant species were documented for the Monument, including one new species to science. The mustard species may be a rare plant.
- The I&M program supported operation of smolt traps for Coho salmon and steelhead trout in two creeks in PORE and GOGA. Over 250 coho smolts left Pine Gulch Creek watershed in 2002. Until the previous year, no coho had been documented in this creek since 1968. In addition, 25 chunky coho salmon juveniles showed up at the Stinson Beach, Easkoot Creek monitoring station. This was the first time ever that coho have been documented at this location in GOGA. During these surveys, crews assisted in the capture and identification of the 1st documented sighting of the tidewater goby (federally threatened) within the Tomales Bay watershed since 1950.
- Surveys for the California freshwater shrimp were conducted within several coastal watersheds within PORE and GOGA. This inventory identified the presence of shrimp in lower Olema Creek within the Cheda Creek watershed. This is the 1st record of this federally endangered species in this creek. The inventory has expanded the number of watersheds containing this endangered species and will help focus management efforts.
- Local citizens protect seals at PORE and GOGA through a collaborative long-term monitoring program between NOAA and NPS. Currently, volunteers conduct all monitoring of seals at the parks. More than 100 volunteers were trained under three different programs administered by two agencies (NPS and NOAA) in FY02 and have been monitoring seals collaboratively, providing information to guide management. NPS volunteers spent over 1500 hours surveying seals, and 2000 hours educating park visitors and protecting seals. The number of northern elephant seal pups continued to increase in 2002 to 449 but the number of pupping locations remained unchanged at six. Harbor seal populations also remained stable in 2002 with a total of over 5000 seals including around 1075 pups counted at 12 locations from Bodega Head to Point Bonita. The park has used the information to adaptively manage the species by establishing seasonal protection periods at key breeding locations. For example, from long-term monitoring of harbor seals at Drakes Estero, biologists were able to determine that pupping rates declined with increased use by recreational

kayakers. The park responded by working with kayakers to close the estero during the harbor seal pupping season but to open the estero during the non-pupping season. As a consequence, seal pupping rates rebounded within two years. The National Marine Fisheries Service has used monitoring data to complete stock assessments of harbor seals and elephant seals.